

NOTES ON THE GENUS *THASUS* (HEMIPTERA: COREIDAE)

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Abstract.—New distributions are given for *Thasus neocalifornicus* Brailovsky and Barrera, *T. gigas* (Klug), *T. acutangulus* (Stål), *T. luteolus* Brailovsky and Barrera, and *T. rutilus* Brailovsky and Barrera. Measurements of several instars and a key to the last three instars of the first three species are given. These new country records are given: *T. acutangulus*, El Salvador; *T. luteolus*, Panama; *T. rutilus*, Bolivia. The distribution of *T. neocalifornicus* is discussed, as are differences among its populations and between them and *T. gigas*. We conclude, tentatively, that *T. neocalifornicus* from the United States-Mexican landmass more closely resembles the *neocalifornicus-gigas* common ancestor than do *T. neocalifornicus* populations from Baja California Sur.

The genus *Thasus* (Coreinae: Nematopodini) was revised recently by Brailovsky et al. (1995b). Since the publication of that revision, some additional data have become available, which we present here. These data are new distributional records for five species, and an account of the immatures of three of them. We also discuss the distribution of *Thasus neocalifornicus* Brailovsky and Barrera and distributional differences in the relative length of its third and fourth antennal segments; this relative length is a feature that sets this species apart from others in the genus.

NEW DISTRIBUTIONAL RECORDS OF *THASUS* SPP.

- Thasus acutangulus* (Stål)**— El Salvador: [new country record]: Mt. San Salvador, 4,000–6,400 ft; 2 mi down from Cerro Verde summit
Guatemala: Antigua; Acatenango
Honduras: [no other data]
México: Chiapas, nr. Slope of Cerro Bola; Chiapas, Municipio de Angel Albino Corzo, mountain rain forest; Municipio de Las Rosas, 3 km SE Aguacatenango, 1,671 m.
- Thasus gigas* (Klug)**— Guatemala: [new country record]: Cunea, 6,000 ft; Chichicastenango, 6,000 ft.
México: San Luis Potosi, 31 km SE of S.L. Potosi, 1,500 m; 2 mi SE of Pedro Montoya. Guadalajara [no further data]. Chiapas, 5 km SE of Jitotol, 1,676 m; Chiapas [sic], Escuintla
Note: In the San Luis Potosi Pedro Montoya specimens, the fourth antennal segment is pale red-brown, like that of *T. neocalifornicus* (see diagnosis of the latter in Brailovsky, et al. [1995b])

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- Thasus neocalifornicus*— México: Sinaloa, Los Mochis; 40 mi s. Culiacan. Sonora, Alamos; Llano; Minas Nuevas; Agua Zarca; E. of Carbo
- United States: Texas, Lyford (Willacy Co.)
- Thasus rutilus* Brailovsky and Barrera— Bolivia: [new country record]: Prov. Sara
- Thasus luteolus* Brailovsky and Barrera— Panama: [new country record]: Boquete, Chiriqui, 800 ft.

The new distributional records for *Thasus gigas* and *T. rutilus* do not extend the ranges of these species notably. The distribution of *T. neocalifornicus* is considered in more detail below. We have also a specimen of *T. neocalifornicus* labeled simply "California, Wickham." We cannot find a Wickham in California, and believe the label to be an error.

If, as we suggest (Brailovsky et al. 1995b), the Costa Rican record of *T. acutangulus* is based on a misidentification, the present El Salvador record extends the range of this species somewhat further south. The new Panama record for *T. luteolus*, hitherto known only from Costa Rica (Brailovsky et al. 1995b), also extends this species' range to the south.

NYPHS OF *THASUS*

Among the specimens assembled for the revision were a few third through fifth instars, including some of the closely related genus (Brailovsky et al. 1995b) *Pachylis*. These nymphs were all dried, on pins. Because of their shriveled condition and because color varies markedly in *Thasus* (and probably in *Pachylis* too), we do not describe these nymphs, but record some measurements (Table 1). We give a key to separate the two genera and the first three instars of the three *Thasus* species available. The egg and the nymphs of *Thasus gigas* have been described and measured by Brailovsky et al. (1995a).

KEY

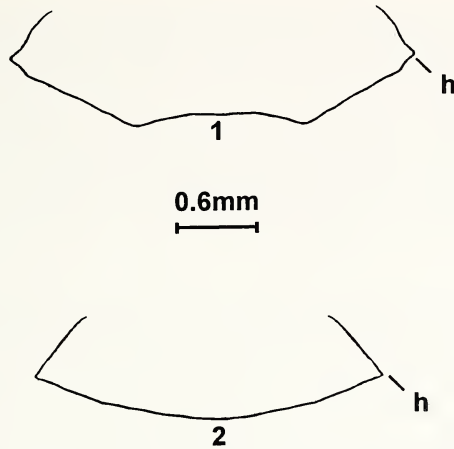
1. Humeral angles obtuse, but with small spine (if spine removed, angle obtuse); posterior border of pronotum with shallow median depression (Fig. 1); hind-tibial dilation asymmetrical on each side of medial tibial ridge (as in adult); one small but distinct tooth subapically on hind tibia *Pachylis*
- Humeral angles sharp, acuminate, sometimes with spine (if spine removed, angle remains acuminate); posterior border of pronotum straight (Fig. 2); hind-tibial dilations symmetrical on each side of medial tibial ridge (as in adult); two small but distinct teeth of equal size subapically on hind tibia (*Thasus*) 2
2. Pronotum almost entirely dark, sometimes with pale central area; humeral angle with small acuminate point *T. gigas*
- Pronotum not almost entirely dark, either lighter or with pale margins; humeral angle with large acuminate point 3
3. Pronotum dark with white or yellow lateral and posterior margins; fourth antennal segment 1.5 times longer than third *T. acutangulus*
- Pronotum yellow to red on disc, this sometimes spreading to margins; fourth antennal segment subequal to or slightly longer than third *T. neocalifornicus*

Table 1. Measurements (mm) of *Thasus* nymphs.

	<i>Thasus gigas</i>		
	Third instar (N = 3)	Fourth instar (N = 3)	Fifth instar (N = 5)
Total length	15.5 (13.8–17.1)	17.8 (17.3–18.7)	25.2 (21.1–28.3)
Width at widest point (abdomen)	8.1 (7.5–8.4)	10.4 (10.3–10.5)	12.5 (10.9–14.0)
Antennal segments: 1	4.6 (4.4–4.9)	6.2 (6.0–6.5)	6.2 (5.9–6.8)
2	3.7 (3.6–3.7)	5.1 (4.5–6.5)	5.0 (4.5–5.8)
3	3.6 (3.6)	5.0 (4.9–5.1)	4.8 (4.6–5.1)
width of 3	2.4 (2.3–2.5)	3.0 (2.9–3.2)	2.5 (2.1–2.9)
4	3.6 (3.6)	4.9 (4.6–5.1)	5.2 (4.9–5.5)
Hind tibia: length	8.5 (8.4–8.9)	12.4 (12.2–12.8)	12.2 (11.5–13.0)
width	2.0 (2.0)	2.9 (2.7–3.0)	2.7 (2.3–2.9)
	<i>Thasus neocalifornicus</i>		
	Second instar (N = 2)	Fifth instar (N = 8)	
Total length	10.7 (10.0–11.4)	25.7 (22.6–28.6)	
Width at widest point (abdomen)	5.5 (5.3–5.6)	11.6 (9.8–13.6)	
Antennal segments: 1	3.2 (3.1–3.2)	6.1 (5.1–6.8)	
2	2.5 (2.5)	4.9 (4.6–5.5)	
3	2.6 (2.6)	4.6 (3.5–5.2)	
width of 3	1.2 (1.2)	1.9 (1.0–2.9)	
4	2.5 (2.4–2.5)	4.6 (4.3–4.8)	
Hind tibia: length	5.2 (5.2)	11.4 (10.4–12.1)	
width	0.9 (0.9)	2.5 (2.2–2.8)	
	<i>Thasus acutangulus</i>		
	Second instar (N = 1)	Fifth instar (N = 4)	
Total length	10.6	21.6 (17.2–27.4)	
Width at widest point (abdomen)	6.2	10.7 (9.2–12.6)	
Antennal segments: 1	—	6.2 (6.0–6.4)	
2	—	4.9 (4.7–5.1)	
3	—	4.8 (4.7–4.9)	
width of 3	—	2.6 (2.4–2.6)	
4	—	6.6 (6.2–6.9)	
Hind tibia: length	6.0	11.4 (11.4–11.7)	
width	0.8	2.8 (2.6–3.1)	

THE DISTRIBUTION AND POPULATIONS OF *THASUS NEOCALIFORNICUS*

Thasus neocalifornicus had long masqueraded as *T. gigas* or *T. acutangulus*, until its status as a separate species was recognized (Brailovsky et al. 1995b). *T. gigas* is the sister species of *T. neocalifornicus*, and the two together compose the sister clade



Figs. 1–2. Pronotum of fifth instar. 1, *Pachylis* sp. h = humeral angle. 2, *Thasus acutangulus*. h = humeral angle.

of *T. acutangulus* + *carchinus*; the differences, similarities, and intraspecific variations of these species have been described (Brailovsky et al. 1995b).

Most of the several hundred *Thasus neocalifornicus* we have seen (and others recorded in Brailovsky et al. [1995b]), are from Baja California Sur, and the United States. Oddly, until now no one has noted that the United States *T. neocalifornicus* is almost completely restricted to the Tucson, Arizona, area, in southern Arizona (Pima, Cochise, and Santa Cruz counties); no specimen among the several hundred seen from the U.S. (including a large collection from Texas A&M University) has been found from west of this area, and only two specimens from east of it. Despite earlier listings of *T. neocalifornicus* (sometimes as *Pachylis gigas*) from New Mexico (e.g., Uhler, 1876; and see Brailovsky et al. [1995b] for summary), we have found no specimen from this state, although it begins only 100 miles east of the Arizona populations.

The two specimens we have seen from east of Arizona were collected on August 19, 1975, in Lyford (Willacy Co.), Texas, which is about 40 miles north of Brownsville. These specimens are somewhat darker than many others, but they fall well within the considerable range of color variation in this species.

Another Texas population of *Thasus neocalifornicus* may be in the making. Dr. Walker Jones (USDA, Weslaco, Texas) writes (September 1993 and, in more detail, March 1995) that in 1992 he accidentally released a few females at Weslaco and, to his surprise, found nymphs the following spring; these he collected when they became adults but, if others avoided capture, a population may develop on *Prosopis glandulosa*, which is readily available. (Note: in his account of these bugs' biology, Jones [1993] referred to them as *Thasus* "*neomexicanus*," a *lapsus calami*.) Weslaco is some 30 miles south of Lyford.

The Mexican populations of *Thasus neocalifornicus* are concentrated at the southern tip of Baja California Sur, in Miraflores, Sierra Laguna, La Paz, Todos Santos, El Triunfo, Cabo San Lucas, San Bartolo, and San Domingo; these are all within 50

miles of Cabo San Lucas, at the tip of the peninsula. In addition, we have seen specimens from Mulege, halfway up the inner coast, and from Rosario, on the outer coast some 150 miles south of the U.S. border. All these Baja California specimens were collected over half a century (1919–1971) by different people, most of whom were Americans. It seems likely then that these collectors did not travel only to the tip of the peninsula, but collected down its length and back up. In other words, the abundance of these bugs at the tip of Baja California Sur does not reflect collector bias; these bugs occur here in greater numbers than they do elsewhere on the peninsula.

They occur here in much greater numbers also than elsewhere in México. We have specimens—only a few in each case—from only eight other localities, Los Mochis and near Culiacan (Sinaloa); and Santa Ana (Brailovsky et al. 1995b), Alamos, Llano, Minas Nuevas, Agua Zarca, and near Carbo (Sonora). Los Mochis is on the coast of the Gulf of California, not far from the Baja-tip populations; and Culiacan is some 100 miles south, also on the coast, near the tip of Baja California Sur. Santa Ana and Llano are equally close to the Arizona populations; Carbo is about 50 miles south of Santa Ana and roughly the same distance from the Gulf of California; but Alamos is far removed from any other population of *T. neocalifornicus*; we cannot find the other two Sonora localities on our atlases, but the entire state of Sonora is no more than 200 miles from the Gulf of California, and is across the Gulf from Baja California.

We have examined representatives of these populations closely, seeking both intra- and interspecific relationships. We looked particularly closely at characters that separate the species, especially *T. neocalifornicus* from *T. gigas*. We wondered if perhaps mainland *T. neocalifornicus* might more closely resemble *T. gigas* (also mainland) than do peninsular (Baja California) *T. neocalifornicus*.

Genitalia.—The degree of spermathecal coiling and the shape of the tooth on the second valvula are the same in both Baja California and Arizona *T. neocalifornicus*, and differ from those in *T. gigas*: less coiling and more deeply bifid, respectively, in *T. neocalifornicus* than in *T. gigas*. With respect to the inner medial projection of the ventral rim of the male's genital capsule, the variation between *T. neocalifornicus* and *T. gigas* is as great as that between *T. neocalifornicus* from Sonora and Sinaloa, and as that between *T. neocalifornicus* from Arizona and Baja California; also within this range of variation are specimens of *T. gigas* from Oaxaca, San Luis Potosi, and Guadalajara. The genital capsule of the single Texas male resembles those from Sonora more than those from elsewhere.

Thus these genitalic characters neither support nor refute the idea that *T. neocalifornicus* from mainland México (and Arizona) more closely resemble *T. gigas* than do *T. neocalifornicus* from Baja California.

Color of fourth antennal segment.—This antennal segment in *Thasus neocalifornicus*, although usually reddish, may be as dark brown as that of *T. gigas*. The latter occurs farther south in México, and the fourth antennal segment of the adult is longer than its third, never subequal. Also, the dark brown of the *T. neocalifornicus* fourth segment often pales to reddish distally. It is interesting in this regard that the third and fourth antennal segments of nymphal *T. gigas* are subequal (Table 1).

The proximal half of the *T. neocalifornicus* second antennal segment may be paler than the distal half, rather than the more usual concolorous. Indeed, this segment in

several specimens from the Huachuca Mountains of Arizona is as red as in *T. acutangulus*, with which these specimens may be confused. However, antennal segments three and four are subequal in these specimens, proving them to be *T. neocalifornicus*.

Humeral angles.—In *Thasus neocalifornicus* the humeral angles are produced as a small spine (Figs. 3–5). The spines of its sister species, *T. gigas*, are more blunt (Fig. 6). In the sister clade (*T. acutangulus* + *carchinus*) of both these species, the humeral angles of *T. carchinus* are more produced than they are in *T. neocalifornicus*, and the angles of *T. acutangulus* are sharp but not produced (Brailovsky et al. 1995b).

The humeral angles of the Arizona and Mexican-mainland (Sinaloa, Sonora) *T. neocalifornicus* are somewhat less acute and produced (Figs. 3, 4) than are the angles of the Baja California Sur populations (Fig. 5). The former bugs' humeral angles therefore resemble those of *T. gigas* slightly more closely than do those of the latter.

Thus of the characters so far compared, only the humeral angles suggest that some populations of *T. neocalifornicus* may be more closely related to *T. gigas* than are other populations. This is insufficient evidence to suggest that *T. neocalifornicus* and its sister species *T. gigas* arose from their common ancestor on the Mexican mainland, although certainly the distribution of the two species supports such a suggestion.

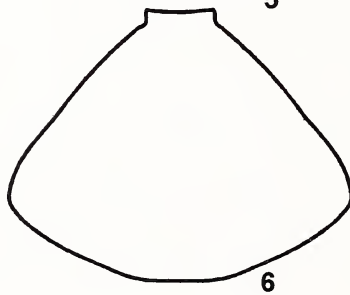
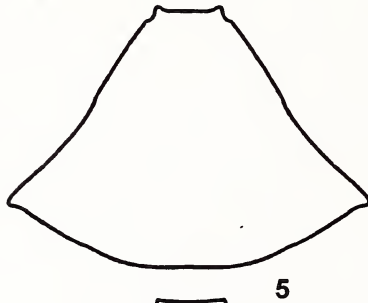
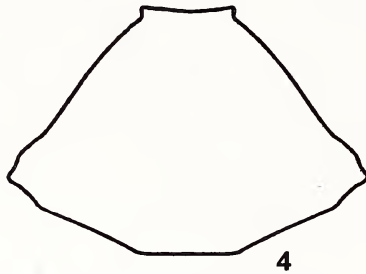
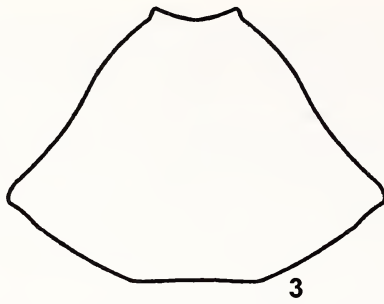
Ratio of third and fourth antennal segments.—*Thasus neocalifornicus* is alone in the genus in having the third and fourth antennal segments equal or subequal; the fourth is longer than the third in the other species, as it also is in the sister genus, *Pachylis* (Brailovsky et al. 1995b). We measured these segments in specimens from several *T. neocalifornicus* and *T. gigas* populations to see what differences there might be among populations, and if populations of one species geographically closer to the other might also be closer in third:fourth antennal segment ratios.

The third and fourth antennal segments of *Thasus neocalifornicus* are equal (ratio of 1.0) to subequal (lowest ratio 0.85, from the Santa Rita Mountains and the Texas specimens) (Table 2). In *T. gigas*, on the other hand, the third is consistently shorter than the fourth (highest ratio 0.80, from Cuernavaca).

The two segments from Baja California specimens are more nearly equal than are those from other localities' specimens; in some of these Baja California specimens, the third antennal segment is actually slightly longer than the fourth (Table 4). All these Baja California specimens came from the tip of the peninsula; unfortunately, the specimens from further north were not available for measuring.

The ratio of the U.S. (0.90) and of the mainland Mexican (0.87) *T. neocalifornicus* are lower (third and fourth less equal) than those of the Baja California (0.95) (third and fourth more nearly equal). The U.S. and mainland *T. neocalifornicus* ratios thus approach those of *T. gigas* (0.77) more closely than do those of the Baja California specimens.

Conclusions.—The scant evidence presented here suggests (but only suggests) that the Baja California populations are isolated and have diverged more from the *neocalifornicus-gigas* common ancestor than have the *T. neocalifornicus* populations on the United States-Mexican landmass. These latter populations are somewhat similar to *T. gigas* in the shape of their humeral angles and in the relative lengths of their third and fourth antennal segments.



6.5mm

Figs. 3-6. Pronota of adult *Thasus*. 3, *T. neocalifornicus* (México: Sinaloa: Los Mochis). 4, *T. neocalifornicus* (U.S.: Arizona: Tucuman). 5, *T. neocalifornicus* (México: Baja California Sur: Miraflores). 6, *T. gigas* (holotype) ("México").

Table 2. Ratios of third to fourth antennal segments of different populations of *Thasus neocalifornicus* and *T. gigas*.

		<i>Thasus neocalifornicus</i>	
Locality		Third : fourth ratio	N
Mexico:	Sonora	0.85	7
	Sinaloa	0.90	6
Mexico: mainland		0.87	13
Arizona:	Tucson	0.95	3
	Baboquivari Canyon	0.93	1
	Patagonia	0.87	12
	Santa Rita Mountains	0.85	2
	"Arizona"	0.91	1
	Santa Catalina Mountains	0.94	2
	Fairbank	0.93	1
Arizona: all		0.90	21
Texas:		0.85	1
Baja California Sur	Triunfo	0.97	16
	San Domingo	1.05	1
	Cabo San Lucas	0.92	2
	San Bartolo	0.90	3
	Miraflores	1.02	10
	Sierra Laguna	0.96	7
Baja California Sur: all		0.95	39
		<i>Thasus gigas</i>	
Locality		Third : fourth ratio	N
Jalisco		0.75	11
México	Ternascaltepa, Cuernavaca	0.82	3
Chiapas		0.73	2
Hidalgo		0.77	3
San Luis Potosi		0.78	8
México: all		0.77	27

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